# LIGHT PLANES

## Something of the History, Development, and Today's Achievements in the Light Plane Phase of Aviation

By Dean Engle

A TALL, slim, nervous-appearing man, walking with a decided limp, modestly wanders through the Taylorcraft factory. Inconspicuous as he may seem he is the boss and everybody knows it. This man is C. Gilbert Taylor.

Gilbert Taylor first became interested in aviation in his early childhood, and although infantile paralysis left him crippled, he determined to make flying his life work. In 1925 Taylor bought an old worn-out Jenny which he rebuilt and redesigned. This was his first attempt, and a successful one, at airplane designing. Several years later Taylor and his brother, Gordon, built a two passenger light plane which they affectionately named Taylor "Chummie". Gordon, accompanied by a passenger, took it up for its initial flight. At 150 feet the passenger "froze" the controls and the ship came writhing down in a dizzy flat spin burying its nose in the soft ground. Thus ended the "Chummie", Gordon Taylor, and the passenger. Although broken up by his brother's death, Taylor determined to continue his work with light planes. He immediately began a canvass of relatives and friends to finance commercial production of the "Chummie". At this point William T. Piper, one of Pennsylvania's leading oil men, enters the picture. Piper's financial backing made possible the organization of the Taylor Aircraft Company. Small sales and expensive hand-labor methods made the price of the "Chummie" almost $4000, and youth of the kind Taylor wanted to reach couldn't afford such extravagant sums. The depression put an end to "Chummie" production.

In 1930, at the depth of the depression, Piper and Taylor brought out the first Taylor Cub. Twenty-four of these cub planes were sold the first year. Squared-off wing tips and squared-off rudder with sharp angles in the fuselage did not make them particularly beautiful but they were safe and dependable. High-list wings prevented stalls, and a 40 h. p. motor gave reliable service. Although no plane is foolproof, the cub plane excused a lot of the mistakes a novice was prone to make. A wide-spaced landing gear, shock absorbers, and low pressure tires together with low landing speed made forced landings in Farmer Jones' pasture not only possible but even practical.

The following year more cubs were produced and each succeeding year found the public demanding more and more of these "practical" planes. Then, on March 16, 1936 fire starting in the dope shop destroyed the entire Taylor Aircraft plant including all drawings and plans. Frantically engineers and production superintendents pooled their information to piece the plane together again and production went on. Production went on in "departments" scattered all over town. A wing was made in someone's shed, the fuselage built up in an idle foundry, assembly in an empty hangar—but production went on. In July of that year the company was moved to Lock Haven, Pennsylvania. At Lock Haven the company obtained an ideal setup. A large reinforced concrete and glass building with two floors some 500 feet in length provided for straightline production. A separate brick building for doping provided both fire protection and better opportunities for the air conditioning necessary for the health of the workers.

Shortly after moving the Taylor Aircraft plant to Lock Haven, ill health forced Taylor to withdraw from the company. The name of the plant has recently been changed to the Piper Aircraft Corporation.

After a short rest Taylor again determined to enter the light plane field. With little capital, but with much determination, he shut himself in a large hangar at Butler Airport, Pittsburgh and went to work with welding torch, a pile of spruce, a few rolls of fabric, and some cans of dope. The result was the Taylorcraft plane. Taylor went immediately to Alliance, Ohio where he formed the Taylorcraft Aviation Corporation and began production of his newly designed plane. This concern has since been joined by Sherman Fairchild.

Although Piper and Taylor were pioneers in placing an airplane within the reach of average Mr. American's pocketbook, they have by no means had the field entirely to themselves. At the time of their beginning the Aeronautical Corporation of America located at Cincinnati was already producing a light plane which was meeting with fair success, and they have continued in the field with increasing prominence. Luscombe Airplane Corporation of West Trenton, New Jersey, one of the latest to enter the field, started production in 1935 and is unique in producing an all-metal plane. This plane consists of a shell-like metal fuselage which contains no longitudinal stiffening members. The strength is entirely in the covering skin sections which are pre-formed and pre-drilled before assembly. The

metal used in the skin is called Alclad which is "Dural" with a pure aluminum coating on both sides. These sections are riveted to form oval-shaped Alclad bulkheads. More than 300 of these ships were sold during their first year on the market and increased demand has caused the Luscombe people to enlarge their floor space.

Naturally, as the number of manufacturers in the light plane field increased, competition between them forced the adoption of production methods in an attempt to produce better planes at lower prices. Methods are now in use whereby the mass production systems so successfully inaugurated in the automotive industry have been transferred directly to airplane manufacture. Although not equivalent to automobile production of a car each minute perhaps, still our leading light plane producers can roll a finished plane from their shops every hour and a half with an employee list numbering only about 500. More advertising has served to bring these planes and their prices before an increasingly air-conscious public.

Today's plane owes its entire success to its remarkable performance. A cross section of today's market shows some of the following characteristics.

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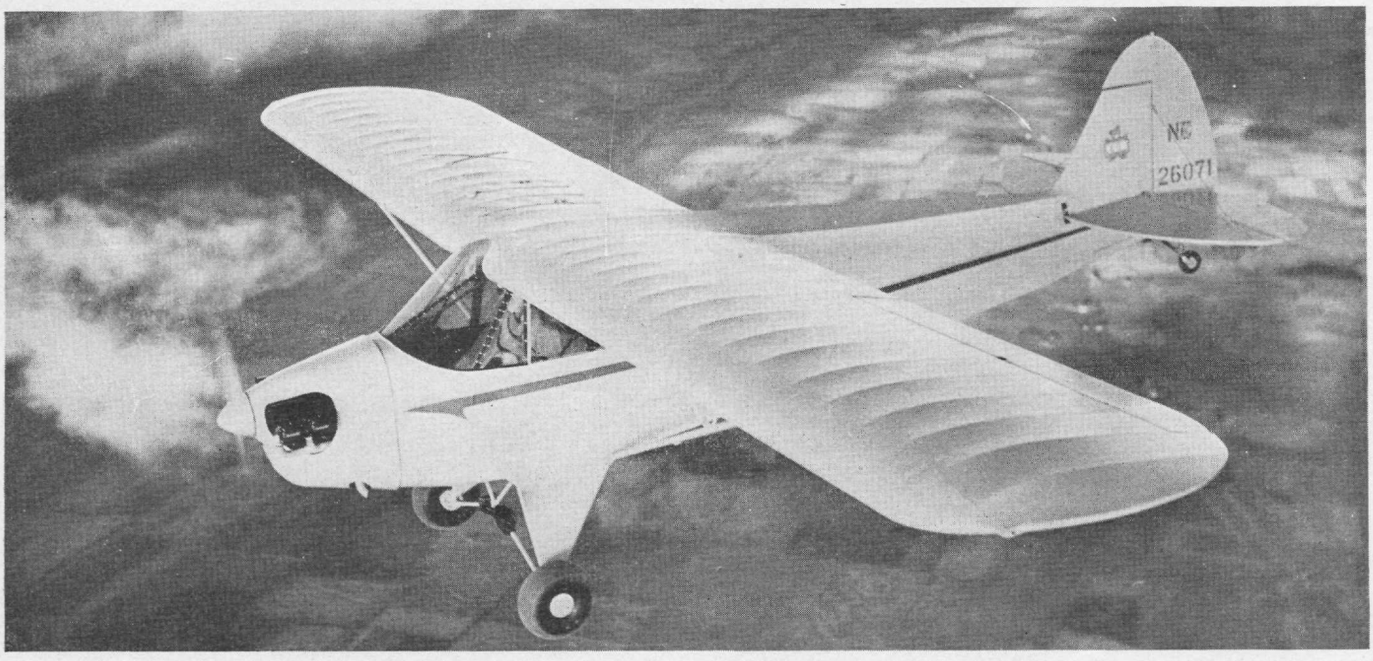
| Useful load | around 500 lbs. |
| Gross weight | slightly over 1000 lbs. |
| Baggage | 40 lbs. |
| Landing run | 100-300 feet |
| Ceiling | 12,000 ft. |
| Cruising range | 300-400 mi. |
| Climb | 400-900 ft./min. |
| Cruising speed | 80-100 mi./hr |
| Landing speed | 30-40 mi./hr. |
| Gasoline consumption | apx. 3.5 gal./hr. |
| Gasoline mileage | 20-25 mi./gal. |

These characteristics will, of course, vary directly with the horsepower motor used. The motor used is usually 40, 50, 65, or even 75 h.p. The manufacturers of light airplane motors have added much to light plane performance by increasing the efficiency of their power units. They are now producing the above motors weighing somewhere around 150 lbs. Although quite distant perhaps they advocate "100 h.p., 100 lbs., $100."

To insure the performance of their planes the manufacturers require test flights of each plane as soon as it leaves the production line. This does not mean the roaring power dives with sand bag weights and instruments recording 6 G's on the pullouts such as the army requires; light planes are tested for performance and "flyability". At 3000 feet the test pilot levels off the new ship and pushes and pulls the controls in every possible direction to check against slip. Next the plane is put in all sorts of odd positions and the controls released. Note is made on the pilot's knee-pad of the planes reaction. This is a check on stability; stability is very important in light planes. Light planes are also required to recover from stalls, flat spins, and shallow dives **hands off.** A few loops and maybe a roll or steep dive followed by a landing complete the test—not just an ordinary landing but a hard bouncing landing just like a student might make on his first try.

Much stress has been laid on the performance of the light plane but the appearance and comfort factors have not been overlooked. Wheel pants add a snappy appearance. Contrasting trim gives a streamlined effect. The interior may have all the conveniences of your car including sound insulation, upholstering, floor mat, decorated dash, heater, glove compartment, and even a radio.

The ease with which a light plane may be flown,

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together with its low cost and upkeep make it beautifully adapted to instruction purposes. With side-by-side seating, conversation between student and teacher may be easily carried on in ordinary tones. The light plane has been a boon to those who teach flying and this market has served as an important outlet to plane manufacturers. Lower-cost equipment and maintenance have reduced the cost of flying lessons which in turn has increased the number of those who are able to take flying instructions. These factors increase the demand for light planes in this field—a happy cycle for all concerned. The cost of flight instruction at the present time will vary with the size of the airport, operating companies, and with other factors. On the average, however, dual instruction may be obtained for from five to ten dollars per hour and solo for four to eight per hour. Eight hours of dual instruction are required by government regulations before soloing is permitted. An additional five hours permits the student to fly alone unhandicapped, and thirty-five hours over the dual time permits the carrying of passengers for pleasure purposes only. The cost of flying and flight instructions may be somewhat reduced by cooperative efforts through flying clubs and the like. Some plane manufacturers offer free dual instruction with the purchase of each plane.

It is but natural that when the Civil Aeronautics Authority inaugurated flight instruction in a number of our leading universities light planes should be used for these courses. These courses consist of seventy-two hours ground instruction and not less than thirty-five hours actual flying. The success of this program might be indicated by its rapid expansion. In 1938, the first year, approximately $100,000 was used to train three hundred and thirty students in thirteen universities. This year, an appropriation of four million dollars was obtained and is being used to train students in three hundred universities. Next June is expected to see 11,000 licensed pilots who, previous to last September, had never flown a plane. This training promises 11,000 potential light plane buyers in addition to the boom created by the C. A. A. program itself.

But, of course, training purposes are not the only use for the light plane. It has found great favor among business men where time is an important and costly factor. Sportsmen find it a handy way to go to and from their favorite retreat. Fishermen, flying cubs equipped with pontoons, land right on their favorite fish-inhabited lake. Fish wardens have also been known to use planes in tracking down illegal netting. News reporters, carrying camera and typewriter in their cubs, fly to, and land at, the scene of the story. Then too there is the large group of enthusiasts who fly for the thrill of flying—flying as a hobby.

The safeness of a cub plane in the hands of the average man is dependent on two of its most prominent characteristics. First, although possessing a fairly decent cruising speed it can be slowed down and still stay in the air. In "soupy" weather the ability to fly low and slowly, "feeling the way", is a decided safety element. Second is the light plane's high gliding ratio. This ratio is about ten to one. This means that in case of a forced landing from, say, 5,000 feet the pilot has an area of 200,000 acres in which to choose a landing

Courtesy Luscombe Aircraft Corp.

spot. Florida has further advanced the safety of flying by free distribution of air maps (quite different from auto maps), emergency fields, and air markings for even tiny groups of houses.

But what about the number of light planes produced today? At the present time Piper is leading the field producing about 250 planes per month. They feature a two-place tandem-seated "Trainer," a luxury "Coupe" having two-place side-by-side seating, and a three place "Cruiser". Prices range from $1,000 to $2,000. Taylorcraft is producing some 60 planes per month consist- of two models, a "Trainer" and a "Deluxe," both having side-by-side seating. Prices range from $1,500 to slightly over $1,800. The Aeronca plant at Cincinnati is also producing about 60 planes each month. The Luscombe Airplane Corporation turns out some 60 planes monthly featuring its all metal plane for just under $2,000. The Culver Aircraft Corporation of Columbus, Ohio has under construction plans to produce a low wing light plane with a retracable landing gear. They hope to get the price low enough to compete in the $2,000 bracket.

Light-plane pioneers are just now beginning to realize one of their fondest dreams—the light plane in direct competition with the automobile. Today's achievements, however, are just a stepping stone on which may be built tomorrow's industry, the importance of which no one may predict.